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## (54) Notification subsystem

(57) A communication method and a network is presented comprising at least one server (1) and a plurality of user terminals (3). The user terminals (3) can share information with each other and with the at least one server (1) by means of a network (2), which can be e.g., the internet. A predefined action is associated by a notification server (29) with a notification. The notification is sent to a user terminal (3) and displayed on a screen (38) of the user terminal (3). The predefined action associated with the notification sent to the user terminal (3) is activated automatically by a response to the displayed notification at the user terminal (3), e.g. by clicking on a notification window on the screen (38) of the user terminal (3). A target address can be associated with a notification sent to a user terminal (3). The predefined action is activated addressed to the target address by the clicking on the notification window. Furthermore, a life span information can be associated with a notification to be sent to the user terminal (3). A data base (36) is accessed by the notification server (29) to store notifications in case the user terminal (3) to which a notification is to be sent is not in a logged-in state.

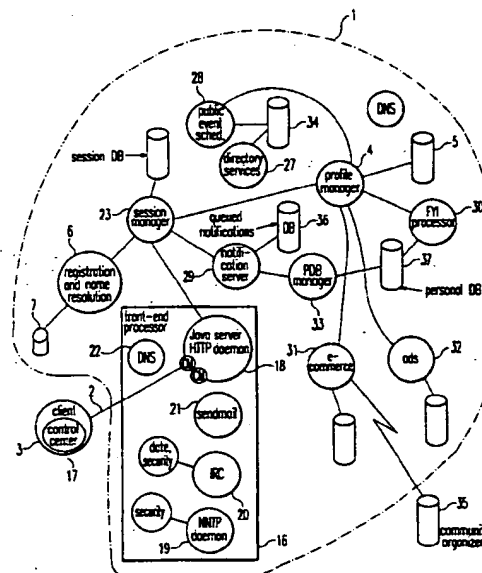


Fig. 2

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## Description

[0001] The present invention generally relates to the field of computer networks.

A network is a distributed communication system of computers comprising user terminals and at least one server, the computers of which are interconnected by various electronic communication links and computer software protocols. A particularly well-known network is the internet. The internet is a world-wide network whose electronic resources include among others text files, graphic files in various formats, world-wide-web pages, etc. The scheme for denotation of an electronic resource on the internet is an electronic address which uniquely identifies its location within the network and within the computer in which it resides. On the internet such an electronic address is called URL (universal resource locator).

[0002] From EP-A-732 660 a communication system is known in which plural client systems refer to the information kept by a server system via a network, comprising a personal information control section provided in said server system and controls first information of the person who handles the client system which is referring to said information. A personal information display section which is provided in said client system and displays the personal information controlled by said personal information control section in a list on the display screen as choices, and a communication channel establishing section which is provided in said client system and establishes the communication channel with the client system corresponding to the choices selected and instructed when the selection and instructions are made on said screen. The action of this known system is as follows. An object has a key information-registration means and informs the attribute of the object to the center station. Attributes of respective objects are stored in the key information-holding means and the center station. Thereby it becomes possible for the object to register the attribute which changes on the real-time basis and the center station. The call relation candidate-requesting means of the object requests the call relation candidate object to the center station, according to need. At this time it is also possible to specify some attributes of the call relation candidate. The call relation candidate-determining means of the center station receives this request, determines the call relation candidate regarding the object, and delivers it to the call relation candidate informing means. The call relation candidate-informing means informs the entry of the call relation candidate to the object. At this time, the attribute of the call relation candidate object registered in the key information-holding means may be informed. The entry of the call relation candidate object informed by the center station is stored in the call relation candidate-storing means of the object. When the attribute of the call relation candidate object is informed by the call relation candidate-informing means, it is also stored therein. The call relation control means of the object refers to the call relation candidate stored in the call relation candidate-storing means and its entry to control the call relation with the call relation candidate.

[0003] The present invention has the object to facilitate the activation of predefined actions by a user in the network.

[0004] The central idea thereby resides in the association of a predefined action with a notification sent to a user terminal, wherein the predefined action can be activated on the user terminal e.g. by clicking on a notification window displaying the received notification (S).

[0005] According to the present invention therefore a communication method for a network comprising at least one server and a plurality of user terminals is provided. The user terminals can share information with each other and with the at least one server by means of a network. According to the present invention a predefined action is associated with a notification. The notification is sent to a user terminal and displayed on a screen of the user terminal. Then the predefined action associated with the notification sent to the user terminal is automatically activated by a response to the displayed notification at the user terminal. For example, the predefined action can be activated by clicking on a notification window on the screen of the user terminal.

[0006] A target address can be associated with a notification sent to a user terminal. When the predefined action is activated by a response to the displayed notification on a screen of a user terminal, the predefined action is addressed automatically to the target address.

[0007] A life span information can be associated with a notification to be sent to a user terminal, wherein the display of the notification on the screen of the user terminal and the activation of the associated predefined action are prohibited as soon as the server detects the expiration of the associated life span information.

[0008] The life span information can be a deadline information or a time duration information.

[0009] In case the user terminal to which a notification is to be sent is not in a logged in state, the notification can be stored in a notification data base connected to the notification server.

[0010] The notification data base can be stored in an object-oriented approach on the server.

[0011] A notification stored in the notification data base can be erased in case the associated life span information has expired.

[0012] According to the present invention furthermore a communication network comprising at least one server and a plurality of user terminals is provided. The user terminals thereby can share information with each other and with the at least one server by means of a network. A notification server is provided to associate a predefined action with a notification and to send a notification to a user terminal. The notification is then displayed on a screen of the user terminal.

The predefined action associated with a notification sent to the user terminal can be activated automatically by a response to the displayed notification at the user terminal, as for example by clicking on a notification window on the screen of the user terminal.

[0013] The notification server can be adapted to associate a target address with a notification sent to a user terminal. The predefined action can be activated addressed to the target address by a response to the displayed notification of the user terminal.

[0014] A notification server can be adapted to associate a life span information with a notification to be sent to a user terminal. The server can be adapted to prohibit the display of the notification on the screen of the user terminal and the activation of the associated predefined action as soon as the server detects the expiration of the associated life span information.

[0015] A notification data base being stored for example in an object-oriented approach on the server can be connected to the notification server to store notifications in case the user terminal to which a notification is to be sent is not in a logged-in state.

[0016] Further characteristics and advantages of the present invention will be explained with reference to embodiments of the present invention and the enclosed drawings.

Fig. 1 shows an overview over a hardware structure which can be used for the application of the present invention,

Fig. 2 shows in detail the activity distribution in the server and the user terminal of the network hardware structure shown in Fig. 1,

Fig. 3 shows a table installed in the server and containing assignment information of different addresses of one user,

Fig. 4 shows an example of the information stored in a group data base, and

Fig.5 shows a flow chart of a procedure effected by the notification system according to an embodiment of the present invention.

[0017] The present invention relates to the technical field of networks particularly for an Internet application. Such a network generally should offer the following services:

- messaging between individuals, or for notification of events or special offers, with the control center prompting for user response;
- web-based e-mail;
- one-to-one and many-to-many chat groups;
- discussion groups (Internet news groups)
- public event scheduling;
- online searching for people, events, and information, with results filtered based on member focus and preferences;
- a free home page
- simple tools to create and modify web pages;
- contact list management and facilities to make it easy to recruit friends and family,
- an address book and personal data base, common across a plurality of devices and services;
- the opportunity to use a plurality of identities per person, along with associated preferences and interests for each identity;
- community center;
- simple tools to enable individual members to set up and manage chat rooms and discussion groups with friends or other like-minded people;
- and innovative navigation

[0018] Further services can comprise narrowly targeted advertising, electronic commerce, and cross-platform support for intelligent devices such as telephones, televisions, or personal digital assistants.

[0019] The members are able to assume several identities: for example, a personal, professional, and one identity used for fantasy or play. Members can have a home page and a profile for each identity, and can maintain anonymity in any interaction, if they so choose. Therefore a plurality of home pages respectively for one identity of a user can be assigned to one user. This will be explained in detail further below.

[0020] Users can control how much screen real estate to devote to the service provided by the present invention at any given moment. Depending on their degree of engagement with the system, the service can appear to members as

an icon, a gadget, or a browser. If members are logged on but primarily interested in doing other work, the service will retire to a corner of the desktop as a modest icon indicating that they are logged in. In this mode, members may still receive notifications, if they choose. An intermediate degree of engagement presents the service as a "gadget" - a control center occupying minimal space on the desktop and allowing users to focus elsewhere while still maintaining immediate access to most functions. When users wish to immerse themselves in the system, they can open their favorite browser and other communication tools and integrate them with the service.

[0021] True to the central tenet of user control, the service offers members the ability to log onto the system and put out the equivalent of a "Do not disturb" sign., if they wish to accomplish something without being interrupted by messages. The "Do not disturb sign" can be limited on a group of identities of the user. Therefore the user can choose which messages he wants to receive even when they are addressed to another identity of the user than the log-in identity.

[0022] Users also have a database of personal information - contact information for friends and associates, lists of upcoming events they are interested in, pending e-mails, news, or any other information they want to keep. Processes in the system automatically create and maintain this database on the server, as a result of specific user action. Because it is kept on the server and not on the user's host computer, this database will be accessible from any compatible device.

[0023] The network according to the present invention is a large, complex, web-based system consisting of multiple databases and many collaborating, communicating processes. The databases hold a rich variety of heterogeneous data. For these reasons, an object-oriented approach is used: it allows rapid prototyping and produces code that is modular and relatively easy to enhance and extend. Also, object-oriented databases are particularly suited to holding heterogeneous data.

[0024] The system according to the present invention uses the Java programming language. Java is optimized for web-based development, being portable on both the server side (the computers executing system processes and running the databases) and the client side (the machine running the user's browser). It is also an object-oriented language and allows for rapid development, since (among other features) it does not require explicit memory management.

[0025] A user connecting to the system starts a client process that coordinates communications with the service and other users. The client process connects to a server using HTTP and communicates with a software entity called Session Manager by means of a persistent process, the Connection Manager.

[0026] The Session Manager allows a user to log into the system once, and then maintain his or her identity while performing any number of operations lasting an arbitrary amount of time. The Session Manager connects to a database of members (including community organizers) and is responsible for knowing who is logged onto the system at any time, and whether they have posted the equivalent of a "Do not disturb" sign. It collaborates with another software entity, the Notification Server, which is responsible for transmitting the messages (notifications) that users can send to each other. This collaboration allows the Notification Server to know who is online at any given time, and who is online but does not wish to be disturbed.

[0027] A Profile Manager maintains a database of user profiles - personal preferences and interests. As the member uses the system, various session-tracking processes watch in the background to capture relevant data (with the user's knowledge and consent). The data is then provided to the Profile Manager.

[0028] User profiles are stored in a manner ensuring security and anonymity. In accordance with the Open Profile Standard, the Profile Manager also ensures that profile information is sent only to those authorized to receive it, and that it is encrypted to ensure privacy.

[0029] An FYI Server is the process that periodically performs searches for information that the user has requested, based on explicitly provided search parameters and information in the user's profile. Its output is stored in the user's personal database.

[0030] A Directory Server enables searching. It maintains a database of all information on the system, in any form - Web pages, user profiles, chat sessions, or any form of events sponsored by community organizers - any kind of data at all. The Directory Server collaborates with the Profile Manager to filter the results of searches and rank them in accordance with the searcher's interests and preferences. The Directory Server also allows members to connect to general World Wide Web search engines; it may also filter the results of those searches.

[0031] A Name Server is an essential part of the transmission infrastructure, keeping track of all the servers on the system in their various locations.

[0032] A typical hardware installation which can find application with the present invention is shown in Fig. 1. Each hardware installation represents a network domain.

[0033] Reference 1 generally designates a server 1 connected to user terminals (clients) 3 by means of a network (Internet) 2.

[0034] Each installation includes at least two process servers 8, 9 each connected to a database 10,11. The process servers 8, 9 are the computers that execute the many interacting software processes. A minimum of two are required for redundancy; if one server 8,9 experiences a problem, the system can continue running and users experience no interruption in service. When a growing number of users 3 place increasing demands on the system, more servers can be added as necessary to increase system capacity.

[0035] The databases 10, 11 associated with the process servers 8, 9 hold the persistent data in the system: information about members, events, discussion groups, home and community web sites, and much else. They may reside on the same physical hard drive or different ones. They are object-oriented databases 10, 11.

## 5 Security

[0036] The databases 10, 11 can contain sensitive private information about members. Security will be implemented by isolating the process servers 8, 9 on a network having an IP address of the form 10.x.x.x. Routers 12 cannot connect directly to such a network. Instead, the network 2 is connected to a hub 15 connected to a bridge 14 which in turn connects to another hub 13. The hub 15 is on a network 2 to which routers 12 can connect.

[0037] The security bridge 14 protects the back-end process servers 8, 9 and databases 10, 11. A firewall could be placed between the hub 13 and the switch 14 to provide additional security for the back-end process servers 8, 9 and databases 10, 11 as well.

## 15 Clients and Front-end Processors

[0038] A user connects to the system using the control center (17 in Fig. 2) - the user's client process 3. The client process 3 connects from the Internet 2, through the router 12, to the external hub 15 and from there to a front-end processor 16: a computer 16 outside the security wall. The front-end processor 16 handles communication between the back-end server 8, 9 and the client 3 during authentication; a necessary step before the client process 3 can access.

[0039] The front-end processors 16 run so called *daemons* - background processes - for HTTP (Web access), NNTP 19 (news and discussion groups), IRC 20 (chat), and e-mail 21. They also run DNS (Domain Name Service) 22. Each front-end processor 16 may run all the required daemons. Alternatively the required daemons may be spread across several front-end processors 16.

[0040] After a user is authenticated following well known procedures, the front-end processors 16 connect the Connection Manager process to the Session Manager 23 through the bridge 14 to a process server 8, 9 and a database 10, 11.

[0041] The central installation also includes a terminal server 24 directly connected to every piece of hardware: computers, bridge 14 and router 12. An ISDN line connects this terminal server 24 to a remote location 25 where the operations manager can run tests, upgrade software, install patches, or reboot systems as necessary. The operation manager's dialup access is also secure; simply knowing the correct telephone number is not enough to gain access to the system through the maintenance channel 26.

[0042] The processes of the hardware structure shown in Fig. 1 will now be explained with reference to Fig. 2.

[0043] The software constituting the processes can be written in Java using an object-oriented design. Most of the software runs on the process servers 8, 9, but also some software is written for the front-end processor 16.

## Front-end Processors

[0044] When a client process 3 (the user's control center 17) connects to a front-end processor 16, that processor's HTTP daemon 18 spawns a new thread to manage the connection as it is known in object-oriented programming. These connection managers are terminated when the user severs the connection.

[0045] The IRC and NNTP daemons 19, 20 also include specialized processes to augment their capabilities. To allow for private chats and discussion groups, both daemons include security software that allows for access control. The IRC daemon 20 also transparently translates user names required by IRC (which have a nine-character limit).

## 45 Process Servers

[0046] The bulk of the processes runs on the back-end process servers 8, 9. In addition to DNS, the processes summarized in Table 1 collaborate to provide NCP's functionality. Each is discussed in greater detail below.

Table 1

NCP Processes		
Process	Purpose	Associated database?
Session Manager 23	Tracks who is logged in (user and personality), and their current state: available, away, busy, or invisible.	Yes
Name Resolution 6	Correctly identifies user based on multiple identity, e.g. helps route user notifications to the correct process server.	Yes
Directory Services 27	Used primarily for searching through the system. May also be used to schedule public events.	Yes
Public Event Scheduler 28	May be integrated with Directory Services instead of separate process (unresolved issue). Schedules public events such as simulcast, celebrity chat.	Uses Directory Services Database.
Profile Manager 4	Updates user's profile in response to specific user actions. Later releases may augment this with session-tracking.	Yes.
Notification Server 29	Sends actionable messages (notifications) to members.	Yes, for queued notifications only.
FYI Processor 30	Searches periodically for new info of interest, based on user's profile.	Uses Profile Manager database 5.
Personal Database Manager 33	Manages a home page info, FYI info, queued notifications, pointer to user profile, application preferences, and "people I know" list.	data base 37
E-commerce 31	Supports online commercial transactions.	Yes.
Advertising 32	Supports targeted advertising	Yes

#### Session Management

**[0047]** The Session Manager 23 collaborates with the connection manager in the front-end processor 16 to enable users to log in and out. In addition, it returns a handle to a user's connection manager whenever a message arrives for that user: a notification, an e-mail message, or any other type of requested connection.

**[0048]** The Session Manager 23 also maintains session state: principally, the user's current "personality" and status. When logged in, users can be available, away, invisible or busy:

- An *available* user can receive notifications from anyone.
- Being *invisible* is a way to accomplish tasks without being bothered by others. While invisible, users can perform any system action they wish, but will not be visible to others' searches, nor will they receive other user's notification. (They may, however, receive notifications from community organizers.)
- While away, users are visible to others. Being away is a means of letting others know that the user has stepped away from the computer for a brief period, perhaps for a cup of tea. If another user requests a chat or other real-time operation, the requester is informed that the requested user is away for a short period, and to try again later.
- Being *busy* tells the others that the user is on the system but otherwise occupied, and doesn't wish to be disturbed. While busy, users are visible to others' searches but will not receive other users' notifications. (They may, however, receive notifications from community organizers.) Those wishing to contact can send e-mail or wait until the user becomes available.

## Name resolution

[0049] This process 6 runs only in the central server. It receives all requests to locate destinations (typically generated from notifications and e-mail), and is responsible for telling the requesting service which physical system the user is logged into, thus allowing the message to be routed to the correct server. It is the sole process with access to this information, thus helping to ensure user anonymity - users will not even be able to look at mail headers and tell which city someone lives in (or near).

## Directory services and event scheduling

[0050] This process 27, 28 can access a database 34 including all the searchable items, such as members, clubs, events, chat rooms, public or semi-private discussion groups, and home pages and other web sites. Searching is text-based, at least initially, using word-matching. Directory services 27 collaborates with the Profile Manager 4 to rank the results for relevance, based on the user's stated interests.

[0051] In addition, users can search for items belonging only to a particular category: for example, only discussion groups or only home pages or only people.

[0052] Event scheduling allows community organizers 35 to schedule events such as simulcasts, chats with public figures, or video conferences or other multimedia events at the most auspicious time. They can query the schedule to determine when possibly competing events are scheduled, and choose a time likely to be favorable.

## Profile manager

[0053] Each user 3 has at least one profile, which stores not only such commonplace information as name, address, nationality and preferred language, but also a variety of more sensitive information such as age, sex, marital status, income, occupation, education, religious preference, social class, lifestyle, and other demographic and psychographic data useful for marketing purposes.

[0054] It is imperative that adequate safeguards ensure that:

- personal information is kept strictly confidential, and
- data gathered for marketing purposes is kept strictly anonymous.

[0055] This is the primary reason for the physical and hardware security described above. No aspect of the software must be allowed to compromise this security.

[0056] Profiles can be used for a variety of purposes:

- special event planning,
- FYI data gathering,
- targeted advertising
- targeted promotions and loyalty programs

[0057] When planning special events, community organizers 35 can find out how many members might be interested in the event, and can send e-mail and notifications only to those whose profiles indicate such potential interest. Although the community organizers 35 will have no knowledge of which specific individuals received their mail or notices, they will be assured that a certain number were sent, and that those who received them are more likely than most to have appreciated them.

[0058] The FYI process 30 uses member profiles to determine which data to gather on each member's behalf.

## Notification server

[0059] The notification server 29 is responsible for sending notifications - actionable messages - between individuals, and between community organizers and individuals. To do so, the notification server 29 collaborates with the session manager 23 to determine who is currently online and available, and to get a handle to the recipient's connection manager in order to deliver the message. It then communicates with the notification server 29 on the recipient's server machine, if different, to deliver the notification.

[0060] Notifications are of two kinds: real-time and queued. *Real-time notifications* are typically from one individual member to another. When received, they are stored on the client's machine 3. If the intended recipient is off-line or invisible, they are not delivered.

[0061] *Queued notifications* are sent by community organizers 35, typically to many members whom the community

organizer believes will be interested. When they are created, the community organizer specifies a "time to live" - a period of time during which the notification remains relevant. If the intended recipient is off-line, they are queued in the notification server's 33 associated database 36 and delivered as soon as the recipient logs in, assuming that this occurs before the notification expires.

5 [0062] According to the present invention notifications appear in the user's control center 17. Clicking on a notification will cause the action to be taken that was specified by the notification server 29 when creating the notification. For example, clicking on an invitation to chat opens a chat window on the screen 38 of the user terminal 3 with a person who sent the invitation, clicking on an invitation to play a game opens a game window with the person who sent the invitation, and clicking on an invitation to a special event can take the user to a page where the special event is occurring.

10 [0063] Only the most recent notification is visible in the control center, but the user can ask to see all the notifications received in the current session.

[0064] The notifications are of two different types: Real-time or queued.

[0065] Real-time notifications can occur between any two members or for example between a community organizer 35 and an arbitrary number of members. They are typically invitations between users, initiated from a person's menu item: For example, associating the action "chat" with the menu item for Siegfried allows you to invite Siegfried to chat simply by a click on a menu item.

[0066] Real-time notifications can also be sent by the server 1 in response to a user request. For example, if Juliet wants to know whether Romeo logs in, she will receive a notification from the server 1 when he does - or when she logs on if Romeo is already available.

20 [0067] When one user 3 sends a notification to another user, he has the right to remain invisible. Members cannot contact each other while remaining hidden.

[0068] Queued notifications are sent only by community organizers 35, usually to a group, and usually to inform them of a special event now taking place or starting soon. Community organizers actually do not know which particular users receive these notifications. The notification exists in a queue in a notification data base 36 connected to the notification server 29. The notification exists until a life span associated with the notification expires.

25 [0069] The server 1 and official community organizers 35 can send notifications to any user currently logged in, even those whose status is "invisible". As it has already been set forth a life span information can be associated by the notification server 29, e.g. with a notification to be sent to a user terminal 3. Once the life span information, which can be a deadline information or a time duration information, has expired, the notification will no longer be displayed on the screen 38 of the user terminal 3 and/or the activation of the associated predefined action is prohibited.

30 [0070] The notification can be associated with a target address, which is e.g. predefined by the notification server 2 in the server 1. When the user 3 receiving said notification clicks on the notification window on his screen 38 such as to activate the action (chat etc.); the action is automatically directed to the target address.

[0071] A procedure effected by the notification system according to the present invention will now be explained with reference to Fig. 5.

35 [0072] In step S1 a client 3 or the server 1 sends a notification directed to another client (user terminal) 3. The local notification server receives said message (step S2). The local notification server forwards the received notification to the session manager 23 (step S3). The session manager 23 determines whether the recipient is local (step S4). In case the result is negative, the local notification server queries the domain name server 22 for the true location of the recipient (step S5). Then the local notification server sends the notification to a remote notification server (step S6). The process is repeated on the remote server (step S7). Finally, the procedure is finished (step S8).

40 [0073] In case a recipient is local as it is decided in step S4, and follows the decision whether the recipient is available (step S9). In case the recipient is available, the notification is sent to the recipient (step S10). The procedure is completed (step S8 in this case).

45 [0074] In case the recipient is not available as it is determined in step S9, it is decided by the notification server 29, whether the notification is to be queued in the notification data base 36. If the result is no, the notification is returned to the sender (step S12) and the procedure is completed (step S8).

[0075] In case it is decided that the notification should be stored and queued in the notification server data base 36, the notification is added to the recipient's notification queue (step S13) and the procedure is completed (step S8).

50 [0076] A plurality of addresses can be assigned to one user, as it is shown in Fig. 3. For example, possible addresses for the user George X. can be

- George@compu.xxx.com
- Superman@sport.xxx.com
- 55 • Max@game.xxx.com

[0077] As can be seen from the above addresses, the user George X. can have different identities (George, Superman, Max) being respectively member of different groups (compu, sport, game, etc.). Each identity is easy to remem-

ber, and as there are different groups of users and one identity is only unique regarding one group, the numbers of interesting identities available for the users can be increased overall.

[0078] "xxx" represents the part of the URL designating the server or a company. Compu, sport and game represent both the group and the server (physical or virtual). The assignment information indicating which addresses are assigned to the same user is stored in a table 6 of the name resolution and registration process of the server 1. Thereby, preferably and object-oriented approach is used. Therefore the server 1 by checking the table 6 knows always which addresses belong to the same user.

[0079] It is assumed, that the user George X. has logged in by using the address "George@compu.xxx.com". In case the server 1 or another user 3 wants to forward a E-mail message to the user George X. who has logged in with the address "George@compu.xxx.com", and addresses this message to the address e.g. "Superman@sport.xxx.com", such a transmission will be prohibited according to the prior art. It will be prohibited, as the address "Superman@sport.xxx.com" at the moment is not available in the network, as George X. has not logged with said address.

[0080] According to the present invention, however, even in the case that George X. has logged in using the address "George@compu.xxx.com" an E-mail message sent for example to the address "Superman@sport.xxx.com" will cause a notification to be sent to George X., as the server 1 will check the table 6 and determine, that the address "Superman@sport.xxx.com" does belong to the user George X., who is in a logged-in state, but with another address ("George@compu.xxx.com"). Therefore the notification could read: "Superman@sport.xxx.com has mail". The user George X. can then decide whether he wants to connect as "Superman@sport.xxx.com" to access the new mail.

[0081] The user can associate the "Do no disturb sign" for a limited number of his identities. For example, when logged-in with the address "George@compu.xxx.com", the user can select to not receive any message or notification addressed to his other address "Superman@sport.xxx.com". Therefore he will not be disturbed by other users seeking for sport orientated users when working professionally on his terminal.

[0082] Of course, the user can also choose that he is completely invisible for predefined identities among all identities assigned to him.

[0083] Respectively one profile containing characteristics of the preferences and/or interests of an associated address can be associated to one of the plurality of addresses assigned to the same user. The profiles can be stored in a database 5 of the profile manager 4. For example, in the case of Fig. 3, the user George X. will have a user profile associated with each of the plurality of addresses shown in Fig. 3. As each of the addresses represents a different identity of the user George X., the associated profiles will indicate different behaviors of George X. depending on the address used to log in by George X.

[0084] Other users will never know, which addresses are assigned actually to the same user person. Full secrecy is guaranteed as only the server knows the correlation of the different unique addresses with the users.

[0085] Members of the network can have profiles of information about them, not just names and addresses, but also their interests and preferences. Members will be able to enter and edit preferences if they wish, but they need not to fill out a form to derive this benefit. Member profiles can be built up over time as a process in the system watches what they access, sign up for, or otherwise evince interest in.

[0086] User profiles can be used to filter searches, so that the results of a keyword search can be ranked according to preferences suggested by the user profile.

[0087] Users can create their home pages by answering a series of questions, and various templates can be available to make it easy for members to create their home pages and other places quickly, without learning HTML. ("Places" are more than simply static text and graphics in an HTML page. They can use data from various databases, accessed by client or server application). Alternatively predefined design elements can be offered by the server (1). Therefore the user can create his home page in an interactive way.

[0088] Generally, according to the present invention an object-oriented approach is preferred for example by using the programming language Java in combination with object-oriented data bases.

[0089] Furthermore, according to the present invention respectively one home page can be created and associated to each of the plurality of addresses assigned to the same user. In the case of Fig. 3, for example, the user George X. can have a home page for the address "George@compu.xxx.com", another home page for the address "Superman@sport.xxx.com" and one further home page for the address "Max@game.xxx.com".

[0090] As each of the addresses represent a certain different behavior of the user George X., the different home pages will be created in a different way. The different home pages can also be stored in the server 1.

[0091] As has been shown with reference to Fig. 3, each address comprises a group name (compu, sport, game). These group names can be predefined and offered by the server 1. In the server 1 a group data base 7 is provided setting forth the different predefined groups offered to the users, the related preferences/interests and the users being members of the corresponding groups. Alternatively, users can create their own groups, define their related preferences/interests and access to the server 1 to add the new created group to the data base 7 in the server 1.

## Claims

1. Communication method for a network comprising at least one server (1) and a plurality of user terminals (3), wherein the user terminals (3) can share information with each other and with the at least one server (1) by means of the network (2), wherein
  - a predefined action is associated with a notification,
  - a notification is sent (29) to an user terminal (3) and displayed on a screen (38) of the user terminal (3), and
  - the predefined action associated with the notification sent to the user terminal (3) is activated automatically by a response to the displayed notification at the user terminal (3).
2. Communication method according to claim 1, characterized in that
  - a target address is associated with a notification sent to an user terminal (3), and
  - the predefined action is activated addressed to the target address by a response to the displayed notification.
3. Communication method according to claim 1 or 2, characterized in that
  - a life span information is associated with a notification to be sent to a user terminal (3) and the display of the notification on the screen (38) of the user terminal (3) and/or the activation of the associated predefined action are prohibited when the server (1) detects the expiration of the associated live span information.
4. Communication method according to claim 3, characterized in that
  - the life span information is a deadline information or a time duration information.
5. Communication method according to anyone of the preceding claims, characterized in that
  - in case the user terminal (3) to which a notification is to be sent is not in a logged-in state, the notification is stored in a notification data base (36) connected to the notification server (29).
6. Communication method according to claim 5, characterized in that
  - the notification data base (36) is stored in an object-oriented approach on the server (1).
7. Communication method according to claim 5 or 6, characterized in that
  - a notification stored in the notification data base (36) is erased in case the associated life span information has expired.
8. Communication network comprising at least one server (1) and a plurality of user terminals (3), wherein the user terminals (3) can share information with each other and with the at least one server (1) by means of the network (2), wherein
  - a notification server (29) is provided to associate a predefined action with a notification and to send the notification to an user terminal (3), where the notification is displayed on a screen (38), wherein the predefined action associated with the notification sent to the user terminal (3) is activated automatically by a response to the displayed notification at the user terminal (3).
9. Communication network according to claim 8, characterized in that

the notification server (2) is adapted to associate a target address with a notification sent to an user terminal (3),  
wherein the predefined action is activated addressed to the target address by a response to the displayed notification on the user terminal (3).

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10. Communication network according to claim 8 or 9,  
characterized in that

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the notification server (29) is adapted to associate a life span information with a notification to be sent to a user terminal (3) and  
the server (1) is adapted to prohibit the display of the notification on the screen (38) of the user terminal (3) and the activation of the associated predefined action as soon as the server (1) detects the expiration of the associated live span information.

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11. Communication network according to claim 10,  
characterized in that

the life span information is a deadline information or a time duration information.

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12. Communication network according to anyone of claims 8 to 11,  
characterized in that

a notification data base (36) is connected to the notification server (29) to store notifications in case the user terminal (3) to which a notification is to be sent is not in a logged-in state.

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13. Communication network according to claim 12,  
characterized in that

the notification data base (36) is stored in an object-oriented approach on the server (1).

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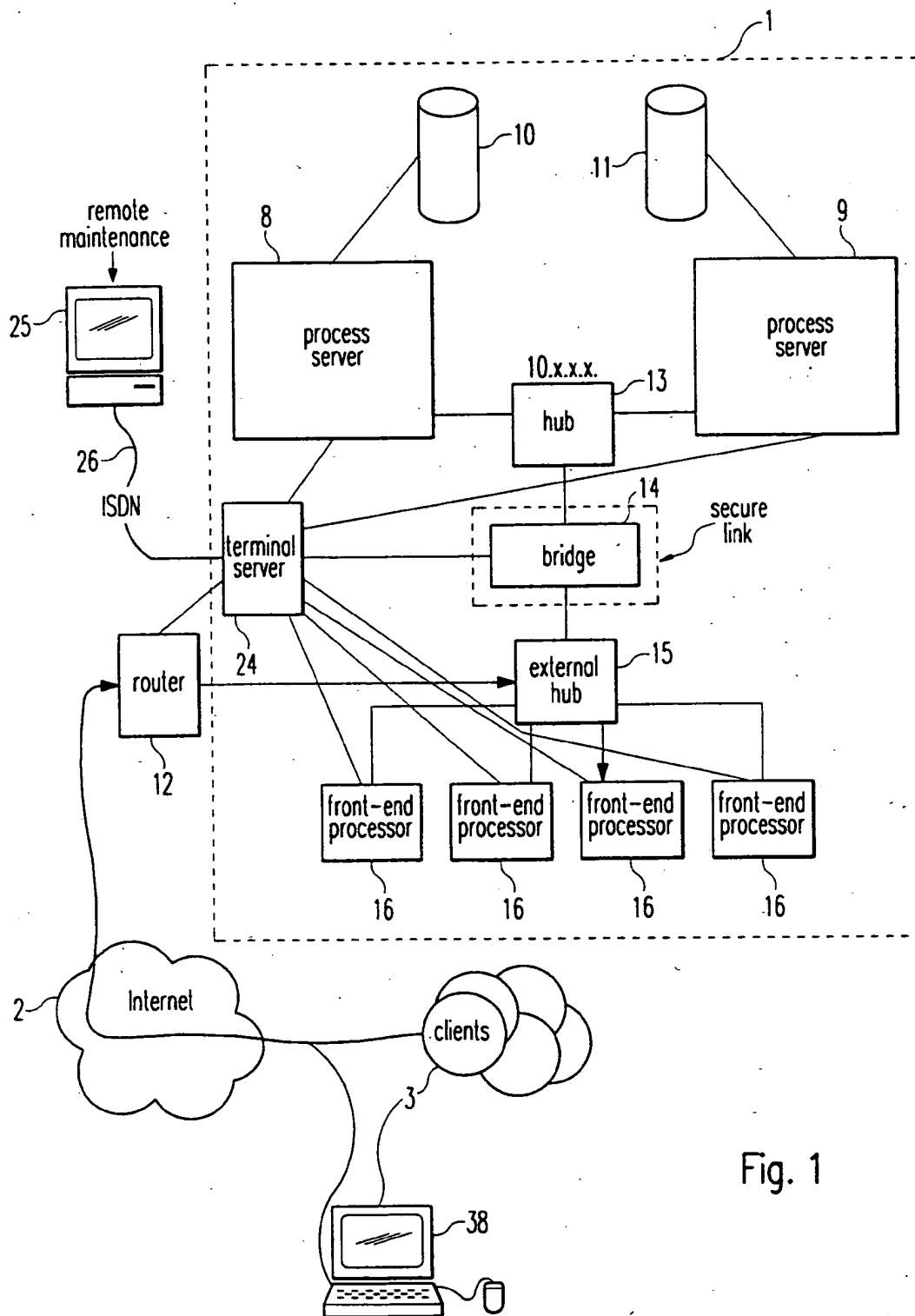


Fig. 1

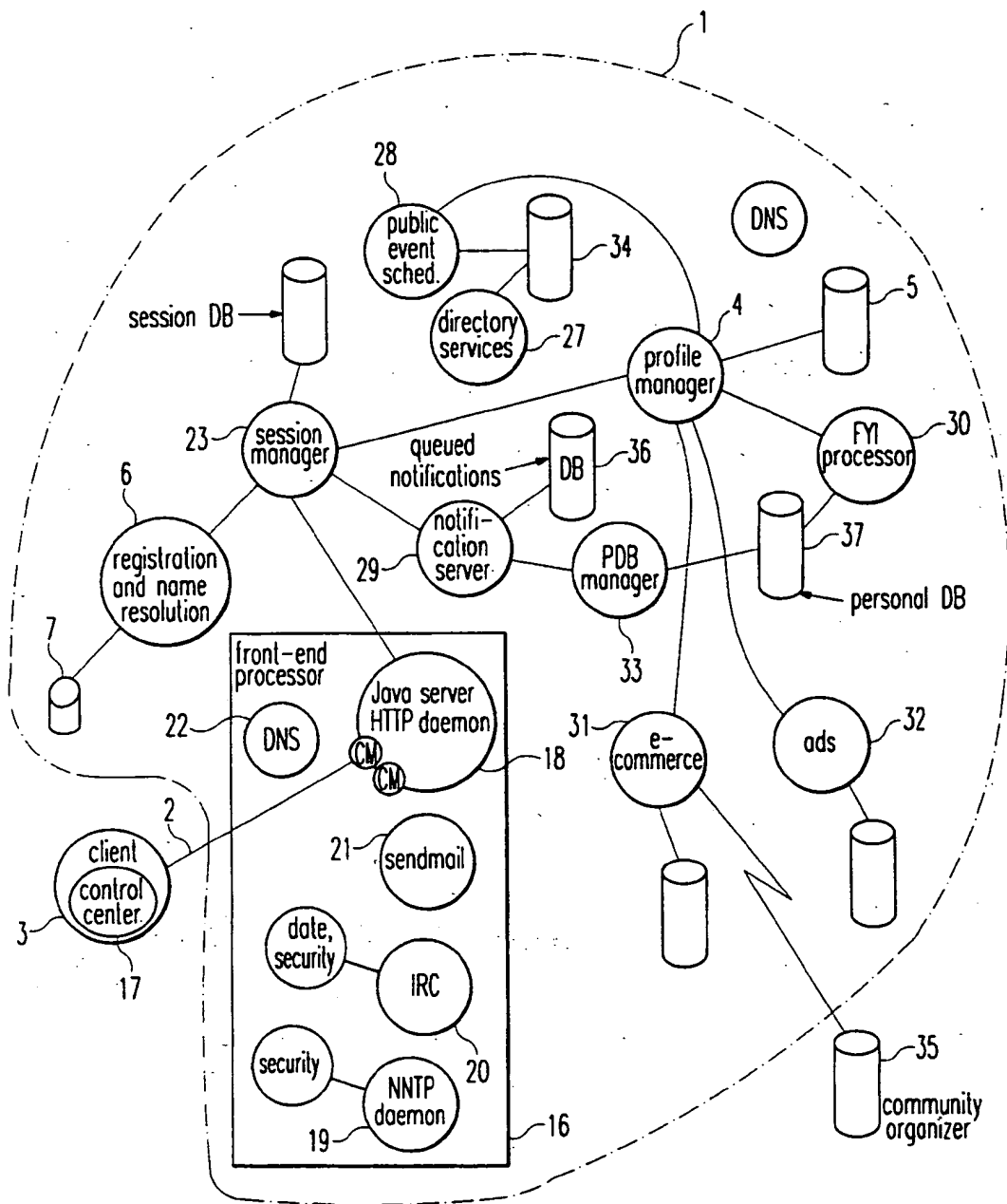


Fig. 2

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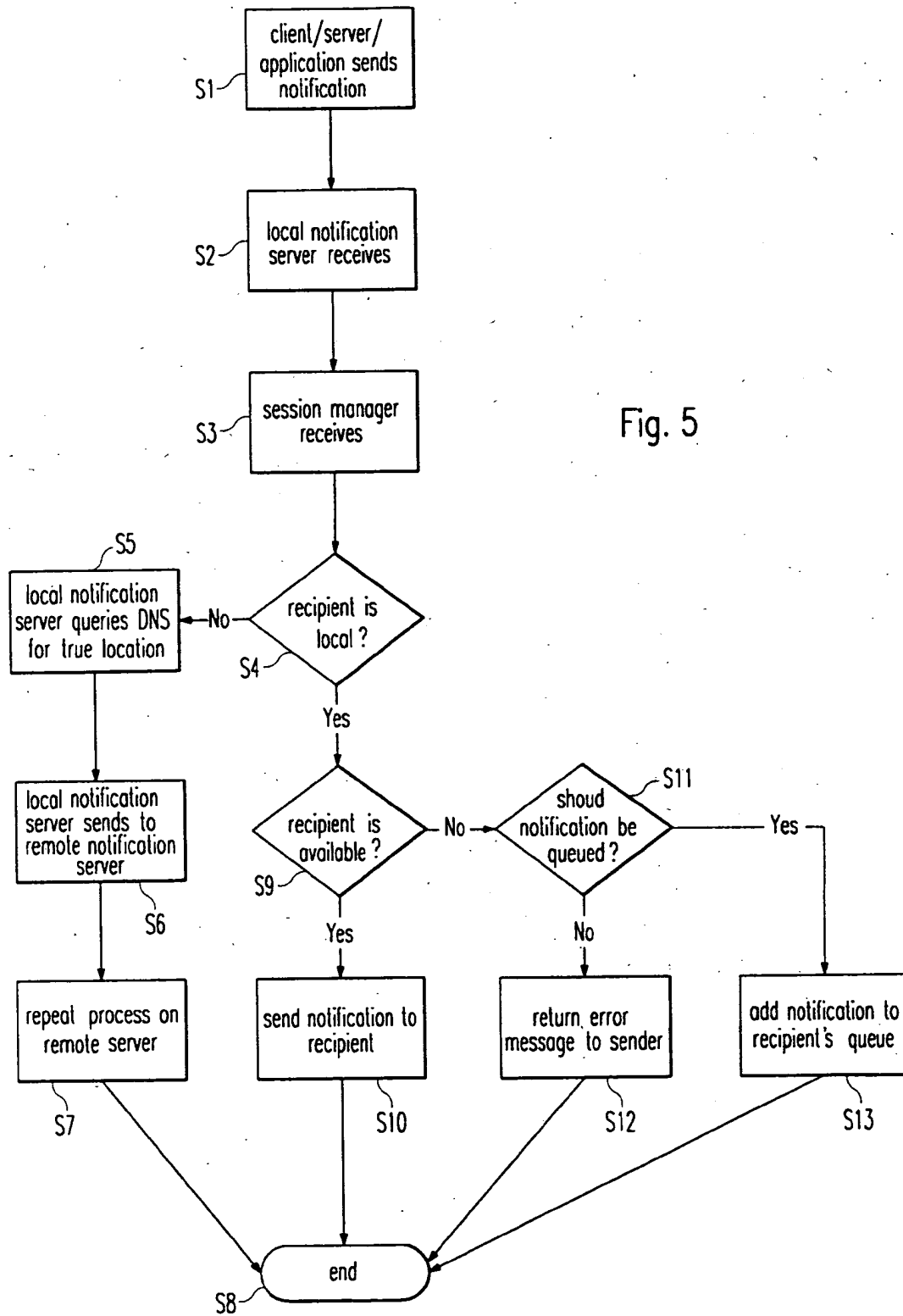
USER	ADDRESSES
George X.	① George.compu.xxx.com ② Superman.sport.xxx.com ③ Max.game.xxx.com
Pete Y.	① ... ② ... ③ ...
...	...

Fig. 3

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group	preferences interests	members
compu	- computers - networks	- George X. - ... - ...
sport	- activities - results	- George X. - ... - ...
game	- computer games	- George X. - ... - ...

Fig. 4





European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 98 10 4933

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	FRIVOLD T J ET AL: "Extending WWW for synchronous collaboration" COMPUTER NETWORKS AND ISDN SYSTEMS, vol. 28, no. 1, December 1995, page 69-75 XP004001212 * page 70, left-hand column, paragraph 2 - page 72, right-hand column, paragraph 4 *	1-4,8-10	G06F17/00 G06F17/60
X	US 5 724 508 A (HARPLE JR DANIEL L ET AL) 3 March 1998 * column 3, line 13 - column 5, line 3; figure 5 * * column 10, line 29 - line 47 *	1,2,8,9	
A	GALL U ET AL: "Promondia: a Java-based framework for real-time group communication in the Web" COMPUTER NETWORKS AND ISDN SYSTEMS, vol. 29, no. 8-13, September 1997, page 917-926 XP004095291 * the whole document *	1,8	
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			G06F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 8 September 1998	Examiner Fournier, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 (03/92) (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 10 4933

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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08-09-1998

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US 5724508 A	03-03-1998	WO 9628790 A	19-09-1996

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82